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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Title: "USER SELECTABLE HARDWARE ZOOM IN A VIDEO DISPLAY
SYSTEM"

Group Art Unit: 2672

Examiner: Mathew LUU

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**PETITION TO MAKE SPECIAL
UNDER 37 CFR 1.102
AND MPEP 708.02 (VIII)**

The Commissioner for Patents
Washington, D.C. 20231
U.S.A

Sir:

The Applicants submit herewith PTO-1449 forms listing the references as well as additional references known to Applicants. The Applicants further enclose a preliminary amendment. A detailed discussion of the references is provided hereinbelow.

In accordance with MPEP 708.202(VIII), Applicants hereby petitions to make this application special. The petition fee of \$130 under 37CFR1.17(i) is enclosed herewith. The Commissioner is hereby authorized to charge any deficiency or credit any overpayment regarding the petition fee to deposit account 19-5113.

According to MPEP 708.02 (VIII), Applicants:

- a) requests that this application be made special under 37CFR1.102;
- b) submits herewith the results of an extensive prior art search.
- c) submits herewith, a copy of each of the references located during the search and of references known to Applicants, which are also included in the PTO-1449 forms submitted herewith;
- d) is submitting herewith a detailed discussion which points out, with the particularity required by 37 CFR 1.111(b) and (c), how the claimed subject matter is patentable over the references.

DETAILED DISCUSSION OF THE PRESENT APPLICATION

The present application concerns a user selectable hardware zoom implemented in a display controller. The system controls a main display device and at least one zoom display device using a single memory surface. One of the main purposes of the system is to allow a user to select fixed frame or fractional portions of a surface displayed on the main display device, and output scaled versions on the zoom display devices. To operate the zoom, the user must first select a portion of the main display surface using a hardware cursor. Once the portion is selected, the resolution of the zoom display device intended to display a scaled version of the selected portion is determined by the system or by user input. The system can thereafter adjust the aspect ratio of the selected portion according to the given resolution. The adjusted portion is then scaled according to the given resolution of the screen or according to the scaling parameters given by the user. The scaled version, saved in memory, can be accessed by a second display controller and displayed on one of the zoom display devices. The only steps performed at the application level are the ones involving user input, detection of

resolution, and aspect ratio adjustments. The other steps being implemented at the hardware level, the present controller is much quicker and more efficient than its counterparts are.

SUMMARY OF THE INDEPENDENT CLAIMS

Summary of Amended Claim 1: A method of controlling a display controller system to provide a display surface zoom, the display controller system having a main surface memory and at least one zoom display device, is claimed. The method comprises the steps of:

1. Receiving user input defining coordinates of a fixed position frame portion within the main surface memory.
2. Determining a resolution of at least one of the zoom display devices and adjusting an aspect ratio of the portion defined by the user input to correspond to the resolution.
3. Programming the display controller system to implement the display surface zoom.
4. Scaling the portion of the main surface memory.
5. Converting the scaled portion of the main surface memory into a display signal.
6. Outputting the display signal to at least one of the zoom display devices.

Summary of Amended Claim 21: A method of controlling a display controller system to provide a display surface zoom, the display controller system having a main surface memory and at least one zoom display device, is claimed. The method comprises the steps of:

1. Receiving user input defining a fractional portion of the main surface memory to be scaled and displayed, the fractional portion being a non-integer fraction of the main surface memory.

2. Determining a resolution of at least one of the zoom display devices and adjusting an aspect ratio of the portion defined by the user input to correspond to the resolution.
3. Programming the display controller system to implement the display surface zoom.
4. Scaling the portion of the main surface memory.
5. Converting the scaled portion of the main surface memory into a display signal.
6. Outputting the display signal to at least one of the zoom display devices.

REFERENCES LOCATED DURING SEARCH:

- [1] US patent No. 5,585,821, to Ishikura et al., assigned to Hitachi Ltd, Hitachi Process Computer engineering Inc., entitled *Apparatus and method for screen display*, issued December 17, 1996.
- [2] US patent No. 5,539,426, to Nishikawa et al., assigned to Kabushiki Kaisha Toshiba, entitled *Image display system*, issued July 23, 1996.
- [3] US patent No. 5,880,709, to Itai et al., assigned to Kabushiki Kaisha Sega enterprises, entitled *Image processing devices and methods*, issued March 9, 1999.
- [4] US patent No. 6,084,565, to Kiya, assigned to Furuno Electric Company Limited, entitled *Image monitoring apparatus*, issued July 4, 2000.
- [5] US patent No. 5,227,771, to Kerr et al., assigned to International Business Machines Corporation, entitled *Method and system for incrementally changing window size on a display*, issued July 13, 1993

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[6] US patent No. 5,910,795, to Whittaker, assigned to VideoLogic Limited, entitled *Digital image signal processing*, issued June 8, 1999.

[7] US patent No. 5,187,776, to Yanker, assigned to International Business Machine Corp., entitled *Image editor zoom function*, issued February 16, 1993.

[8] US patent No. 5,841,418, to Bril et al., assigned to Cirrus Logic, Inc., entitled *Dual displays having independent resolutions and refresh rates*, issued November 24, 1998.

[9] US patent No. 6,018,340, to Butler et al., assigned to Microsoft Corporation, entitled *Robust display management in a multiple monitor environment*, January 25, 2000.

[10] US patent No. 5,195,174, to Kagawa, assigned to Kabushi Kaisha Toshiba, entitled *Image data processing apparatus capable of composing one image from a plurality of images*, issued March 16, 1993.

[11] US patent No. 6,028,585, to Ischii et al., assigned to International Business Machine Corporation, entitled *Screen display controller method and a screen display control apparatus*, issued February 22, 2000.

[12] US patent No. 5,767,834, to Vouri et al., assigned to Binar graphics , Inc., entitled *Method of resetting a computer video display mode*, issued June 16, 1998.

[13] US patent No. 4,875,173, to Nakajima, assigned to Minolta camera Kabushiki Kaisha, entitled *Image enlarging method and device*, issued October 17, 1989.

[14] US patent No. 5,172,103, to Kita, assigned to Kabushiki Kaisha Toshiba, entitled *Image display apparatus*, issued December 15, 1992.

[15] US patent No. 5,805,132, to Imaizumi et al., assigned to Minolta Co., Ltd., entitled *Image editing apparatus capable of setting image-processing region on display screen*, issued September 8, 1998.

[16] US patent No. 5,596,346, to Leone et al., assigned to Eastman Kodak Company, entitled *Method and apparatus for applying a function to a localized area of a digital image using a window*, issued January 21, 1997.

[17] US patent No. 5,125,043, to Karlsson, assigned to Microterm Inc., entitled *Image processing with real time zoom logic*, issued June 23, 1992.

DETAILED DISCUSSION OF U.S PATENT No. 5,585,821 [1]

U.S patent 5,585,821 relates to a method and an apparatus to control screen displays. In a system comprising a plurality of display apparatuses, the invention allows a user to move a cursor from one apparatus to another without losing track of the cursor's position. According to the invention, each display apparatus provides the user with graphical links to other display apparatuses. When a user moves his cursor over one of the links, the cursor control program, running on a controller of the current screen, starts program specific to the link. The latter program sends a message to the controller of the display apparatus corresponding to the link. Upon receipt of the message, the latter controller enables its cursor control program and sends a message to the first controller so it can disable its cursor control program. Thereafter, the cursor appears on the display apparatus corresponding to the link, disappears from its original location, and the control of the cursor is transferred from the first cursor controller to the second one. In another embodiment, the invention can be used to switch windows instead of screens.

COMPARISON WITH APPLICANTS' INVENTION

Steps 1, 2, 3, 4, 5 and 6 as described in claim 1 are not suggested by reference [1]. Although the reference describes links between display apparatus, there is no suggestion or disclosure of the scaling of an image between two or more display apparatus.

Steps 1, 2, 3, 4, 5 and 6 as described in the summary of claim 21 are not suggested by reference [1] for the same reasons as those described in the paragraph above relating to claim 1.

DETAILED DISCUSSION OF U.S PATENT No. 5,539,426 [2]

U.S patent 5,539,426 concerns an image display system that allows a user to determine the most practical image parameters (such as window level and window width) for the type of image he/she is working with. To operate the system, the user must first generate an image representative of the type of image the user will be handling. Once the image is generated, it is reduced and saved in memory. Copies of the reduced image are then displayed on a screen, and aligned in function of their associated parameters. The associated parameters can be generated by the system or provided as inputs by the user. The user can then select one of the copies using a cursor and display an unreduced version of the image on the screen. In other words, the image is displayed according to its parameters. This function allows the user to see how a type of image changes according to its parameters. Such a system can be very practical for professionals involved in image analysis. For instance, doctors can use the system to set the image parameters on MRI systems or other image generating apparatus according to the quality of their apparatus, and the level of detail required by their type of analysis.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 5,539,426 suggests step 4 as described in the summary of claim 1, but not the combination of steps 1, 2, 3, 4, 5 and 6. Therefore, Applicants believe that reference [2] does not describe the invention as claimed in claim 1.

U.S patent 5,539,426 suggests step 4 as described in the summary of claim 21, but not the combination of steps 1, 2, 3, 4, 5 and 6. Therefore, Applicants believe that reference [2] does not describe the invention as claimed in claim 21.

DETAILED DISCUSSION OF U.S PATENT No. 5,539,426 [3]

U.S patent 5,539,426 relates to an image-processing device for video games. The invention allows a player to clearly identify video game characters and their status as they appear on the player's screen. The system comprises a cursor control circuit that surrounds certain video game characters with a cursor. The cursor follows the characters' every movement throughout the characters' appearance on the screen and its shape and color is sensitive to the characters' status. In a preferred embodiment, when a character appears on the screen, its scale counter is incremented, the system gradually zooms-in on the character, allowing the user to easily identify and follow the character. When the character is of no more interest to the user, its scale factor is decreased, and the system gradually zooms-out on the character to prevent it from interfering with the user's sight.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 5,539,426 suggests step 4 as described in the summary of claim 1, but not the combination of steps 1, 2, 3, 4, 5 and 6. Therefore, Applicants believe that reference [3] does not describe the invention as claimed in claim 1.

U.S patent 5,539,426 suggests step 4 as described in the summary of claim 21, but not the combination of steps 1, 2, 3, 4, 5 and 6. Therefore, Applicants believe that reference [3] does not describe the invention as claimed in claim 21.

DETAILED DISCUSSION OF U.S PATENT No. 6,084,565 [4]

U.S patent 6,084,565 relates to an image monitoring apparatus mainly used in radar systems. The invention allows a user to display an image of the monitoring area, and an image of a portion of the monitored area in separate windows sharing the same screen, according to the user's settings. In one preferred embodiment, the user is provided with means to select a portion of the screen that he would like to monitor. An image generating circuit then continuously generates images of the selected area, regardless of the movement of the apparatus, and sends the graphics data to a display controller. The display controller thereafter scales and converts the data received from the image generating apparatus according to the user's settings, outputs a scaled version of the selected portion of the main display surface in a window, and allows the main display surface to be displayed in another window on the same screen at the same time.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 6,084,565 suggests a combination of steps 1, 4, and 5, as described in the summary of claim 1, but not that of steps 1, 2, 3, 4, 5 and 6. As stated in the summary of reference [4], "the invention allows a user to display an image of the monitoring area and an image of a portion of the monitored area in separate windows on the same screen ". Applicants' invention displays an image of the monitoring area on one screen while displaying an image of a portion of the monitored area on a separate screen, the separate screen being a zoom display apparatus. Reference [4] does not suggest the use of a plurality of screens to provide users with a better view of both the main display surface and a portion of the main display surface. Furthermore, the invention of reference [4] does not have the circuitry required to determine the resolution of a

screen, and adjust aspect ratios in function of the resolution. Therefore, steps 2, 3 and 6 as described in the summary of claim 1 are not suggested by reference [4]. Consequently, it is believed that reference [4] does not suggest Applicants' invention as described in claim 1.

U.S patent 6,084,565 suggests a combination of steps 1, 4, and 5, as described in the summary of claim 21, but not that of steps 1, 2, 3, 4, 5 and 6. As stated in the summary of reference [4], "the invention allows a user to display an image of the monitoring area and an image of a portion of the monitored area in separate windows on the same screen ". Applicants' invention displays an image of the monitoring area on one screen while displaying an image of a portion of the monitored area on a separate screen, the separate screen being a zoom display apparatus. Reference [4] does not suggest the use of a plurality of screens to provide users with a better view of both the main display surface and a portion of the main display surface. Furthermore, the invention of reference [4] does not have the circuitry required to determine the resolution of a screen, and adjust aspect ratios in function of the resolution. Therefore, steps 2, 3 and 6 as described in the summary of claim 21 are not suggested by reference [4]. Consequently, it is believed that reference [4] does not suggest Applicants' invention as described in claim 21.

DETAILED DISCUSSION OF U.S PATENT No. 5,227,771 [5]

U.S patent 5,227,771 relates to a method and a system to incrementally scale an application window on a display. The invention displays two icons on the toolbars of application windows. One icon is used to enlarge a window, and the other, to reduce the size of the window. When a user clicks on the enlarge icon and holds the mouse button down, a subroutine specific to the icon is initiated. The subroutine increments the size of the window gradually, holding one of the corners of the window in a fixed position. The subroutine also reconfigures the data displayed inside the window according to the change of size of the window, and keeps the cursor attached to the enlarge icon. When

the user releases the mouse button, the system quits the subroutine, and returns to its regular operations. When a user double clicks on the enlarge icon, the window is displayed full screen, using another subroutine. As for the other icon, it is operated in a similar manner, but the results are different. The window size is reduced and a double click on the icon reduces the window to an icon. The user is allowed to change some of the system's settings such as the increments used when enlarging or reducing a window.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 5,227,771 teaches how to scale an application window. However, it does not teach how to scale a portion of a main display surface. Therefore, reference [5] does not suggest step 4, as described in the summary of claim 1. Furthermore, steps 1, 2, 3, 4, 5 and 6 are not suggested by reference [5]. Therefore, reference [5] does not suggest Applicants' invention as described in claim 1.

U.S patent 5,227,771 teaches how to scale an application window. However, it does not teach how to scale a main display surface. Therefore, reference [5] does not suggest step 4, as described in the summary of claim 21. Furthermore, steps 1, 2, 3, 4, 5 and 6 are not suggested by reference [5]. Therefore, reference [5] does not suggest Applicants' invention as described in claim 21.

DETAILED DISCUSSION OF U.S PATENT No. 5,910,795 [6]

U.S patent 5,910,795 relates to a digital image signal processing system, which is particularly useful for image scaling. According to the reference, an image can be scanned using a special type of raster. By scanning blocks of relatively adjacent pixels, buffers can be used to store one line of a pixel block. A system comprising two buffers can therefore store two lines of a block of pixel data at once, which is practical for scaling purposes. When an image is to be reduced, each group of vertically and

horizontally adjacent input block pixels can be converted into a single pixel by using weighted addition. As for the scaling function, additional pixel lines can be added using interpolation. Initially, pixel data is received by a VESA media channel interface, and stored in a FIFO before being disassembled into a standard processing format in the unpacker. The standard format data is then sent to a color space converter, causing the pixel data to be converted from a YUV format to an RGB format. The data is then sent to the scaler, where the above-mentioned scaling process takes place. In the case where the image was reduced, a clipper smoothes the image by overlapping blocks of pixels. The clipper generates the window to display the scaled image by masking all the pixels that are outside of a rectangular window. The pixels are then sent to the packer for reformatting, through the FIFO, and back to the VESA media channel interface.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 5,910,795 allows a user to display a scaled version of a main display surface in a window. However, it does not allow a user to scale a portion of a main display surface. Therefore, step 4 as described in the summary of claim 1 is not suggested by the reference. Furthermore, steps 1, 2, 3, 5, and 6 are not suggested in the reference. Therefore, the reference does not suggest the Applicants' invention as described in the summary of claim 1.

U.S patent 5,910,795 allows a user to display a scaled version of a main display surface in a window. However, it does not allow a user to scale a portion of a main display surface. Therefore, step 4 as described in the summary of claim 21 is not suggested by the reference. Furthermore, steps 1, 2, 3, 5 and 6 are not suggested in the reference. Therefore, the reference does not suggest the Applicants' invention as described in the summary of claim 21.

DETAILED DISCUSSION OF U.S PATENT No. 5,187,776 [7]

U.S patent 5,187,776 relates to an image editor zoom. It provides a user with a scaled view of a portion of a main display surface in a window occupying substantially the entire area of the screen and an unscaled view of the same portion of main display surface in a smaller window, referred to as a viewport. Once a user displays on his screen an image that he would like to scale, he can activate the zoom function using a keystroke such as CTRL Z. The system then retrieves a copy of the image to be scaled from a display memory and saves it in a World Plane Buffer. The user can then select an area of interest by placing his cursor at the center of the area of interest. The system determines the coordinates of the area of interest of a viewport, which will be used to display an unscaled image of the area of interest. A CPU thereafter accesses the area of interest saved in the WP buffer and scales the image according to the user's requested scaling factor. The pixel data corresponding to the scaled image is written to the display memory for full screen display, and the pixel data corresponding to the unscaled image is written in display memory according to the coordinates of the viewport. The display controller can then access the pixel data from display memory and provide the user with a zoom window and a smaller viewport window. The user can then interact with the system and change the scaling factor, the area of interest, and other settings according to his needs.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 5,187,776 suggests a combination of steps 1, 4, and 5, as described in the summary of claim 1, but not that of steps 1, 2, 3, 4, 5 and 6. As stated in the summary of reference [7], the invention provides a user with a "scaled view of a portion of a main display surface in a window occupying substantially the entire area of the screen, and an unscaled view of the same portion of main display surface, in a smaller window". Applicants' invention displays an image of the monitoring area on one screen while displaying an image of a portion of the monitored area on a separate screen, the latter

screen being a zoom display apparatus. Reference [7] does not suggest the use of a plurality of screens to provide users with a better view of both the main display surface and a portion of the main display surface. Furthermore, the invention of reference [7] does not have the circuitry required to determine the resolution of a screen, and adjust aspect ratios in function of the resolution. Therefore, steps 2, 3 and 6 as described in the summary of claim 1 are not suggested by reference [7]. Consequently, it is believed that reference [7] does not suggest Applicants' invention as described in claim 1.

Reference [7] suggests a combination of steps 1, 4, and 5, as described in the summary of claim 21, but not that of steps 1, 2, 3, 4, 5 and 6. As stated in the summary of reference [7], the invention provides a user with a "scaled view of a portion of a main display surface in a window occupying substantially the entire area of the screen, and an unscaled view of the same portion of main display surface, in a smaller window". Applicants' invention displays an image of the monitoring area on one screen while displaying an image of a portion of the monitored area on a separate screen, the latter screen being a zoom display apparatus. Reference [7] does not suggest the use of a plurality of screens to provide users with a better view of both the main display surface and a portion of the main display surface. Furthermore, the invention of reference [7] does not have the circuitry required to determine the resolution of a screen, and adjust aspect ratios in function of the resolution. Therefore, steps 2, 3, and 6 as described in the summary of claim 21 are not suggested by reference [7]. Consequently, it is believed that reference [7] does not suggest Applicants' invention as described in claim 21.

DETAILED DISCUSSION OF U.S PATENT No. 5,841,418 [8]

U.S patent 5,841,418 relates to a dual-display controller. The invention can control different displays having different refresh rates and different resolutions by separately feeding video data from display memory to different data paths (CRT data paths and LCD data paths). Video data fetched by the CRT data path from display memory is

saved in a CRT FIFO before being sent to a CRT video data path. A CRT controller may modify the data in the data path according to the requirements of the system (data decompression, sequence control...). The data is then sent to a RAM component, comprising a LUT. The LUT associates to each data entry the corresponding pixel color and information. The data is then sent to a DAC, to be converted to an analog signal, before being displayed on a CRT display. Alternatively, the data in the RAM component can be sent to a TV encoder NTSC/PAL before being displayed on a TV. A CPU data path can interface with an external CPU to allow an outside system to change or add to the data found in the display memory, the CRT FIFO, the CRT video data path, and the RAM. As for the LCD path, very similar to the CRT, it comprises an LCD FIFO, an LCD video data path, and a RAM. However, a dither and a shade controller can modify data coming out of the RAM. The dither performs spatial dithering whereas the shade controller handles the frequency of activation of each pixel. The resulting pixel data is then saved in half-frame buffers to comply with the dual scanning of LCD displays. The invention allows a user to switch screens by using a hotkey or simply by moving a cursor outside of the boundaries of a screen. In an alternative embodiment, the controller can use a single path, with a tagging system, which allows a mux to identify the destination of its input data.

COMPARISON WITH APPLICANTS' INVENTION

Steps 1, 2, 3, 4, 5 and 6 as described in claim 1 are not suggested by U.S patent 5,841,418. There is no suggestion of scaling an image from one display to another. Therefore, the reference does not suggest the Applicants' invention as described in the summary of claim 1.

Steps 1, 2, 3, 4, 5 and 6 as described in the summary of claim 21 are not suggested by U.S patent 5,841,418. There is no suggestion of scaling an image from one display to another. Therefore, the reference does not suggest the Applicants' invention as described in the summary of claim 21.

DETAILED DISCUSSION OF U.S PATENT No. 6,018,340 [9]

U.S patent 6,018,340 relates to a display manager in a multiple display environment. The invention comprises an operating system comprising a forking display driver and at least two monitors. The combination of the screen space of the monitors is called the virtual monitor space. The forking display driver first analyses the position of an object within the virtual monitor space relatively to each of the actual monitor spaces. The forking display driver then goes on to determine whether an object is partially within a null space. According to the analysis, the forking display driver chooses the most appropriate monitor space to display the object and displays the object on the chosen monitor space. The invention therefore allows a user to move objects from one monitor to another, regardless of the shapes of the monitors. In another embodiment, the invention even allows an object to span more than one monitor space. The latter embodiment provides users with a virtually continuous desktop spanning a plurality of monitor spaces.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 6,018,340 and the Applicants' invention both have the ability to display images on different screens. However, reference [9] does not suggest or teach a method of scaling a portion of the display and outputting the scaled version on a different screen. Therefore, steps 1, 2, 3, 4, 5 and 6 as described in claim 1 are not suggested by reference [9].

U.S patent 6,018,340 and the Applicants' invention both have the ability to display images on different screens. However, reference [9] does not suggest or teach a method of scaling a portion of the display and outputting the scaled version on a different screen. Therefore, steps 1, 2, 3, 4, 5 and 6 as described in claim 21 are not suggested by reference [9].

DETAILED DISCUSSION OF U.S PATENT No. 5,195,184 [10]

U.S patent 5,195,184 relates to an image processing apparatus allowing a user to compose an image from a plurality of images. To operate the apparatus, a user must first select a processing mode using his keyboard. Once the mode is selected, the user can request the scanning of a document using his keyboard. The image is then photoelectrically converted into image data. Once the image is converted, the resulting data can be modified by an enlargement/reduction circuit, as well as a length/breadth conversion circuit, according to the selected mode, before being stored in a page memory, according to addresses generated by an address generator, also according to the selected mode. The user can repeat the above-mentioned steps until all the required images are scanned, processed and stored in page memory. The system thereafter transmits all the image data stored in the page memory to the display memory in order to have the final image, composed from a plurality of images, displayed on a display screen.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 5,195,184 suggests the scaling and conversion of an image into a display signal and the displaying of the signal on a display apparatus. However, the images mentioned in reference [10] are scanned documents, whereas in the Applicants' invention, the image processing concerns portions of a main display memory. Therefore steps 3, 4, 5 and 6 as described in the summary of claim 1 are not disclosed in reference [10]. As for steps 1, and 2 they are not suggested by reference [10].

U.S patent 5,195,184 suggests the scaling and conversion of an image into a display signal, and the displaying of the signal on a display apparatus. However, the images mentioned in reference [10] are scanned documents, whereas in the Applicants' invention, the image processing concerns portions of a main display memory.

Therefore steps 3, 4, 5 and 6, as described in the summary of claim 21 are not disclosed in reference [10]. As for steps 1, and 2 they are not suggested by reference [10].

DETAILED DISCUSSION OF U.S PATENT No. 6,028,585 [11]

U.S patent 6,028,585 relates to a screen display controller having the ability to control a plurality of screens connected to an apparatus such as a personal computer. The screen display controller allows a user to change the destination of an output display signal to a selected screen and dynamically modifies the resolution of the selected screen according to the output display signal. In order to perform the above-mentioned switching, the controller determines the maximum resolution of each connected screen. The controller then proceeds to determine the maximum static resolution according to the screen display ability of the operating system running on the apparatus, for allocating the buffer of the apparatus. The user selects one of the plurality of screens connected to the apparatus as the new destination of the output display signal. The controller then determines the maximum display resolution, which is the maximum resolution with which a display can be drawn by the software running on the apparatus. The system finally lowers the screen's resolution to the lower resolution of the maximum dynamic resolution, and the physical maximum resolution. Therefore, the video signals never exceed the drive ability of the selected screen and the hardware is not damaged.

COMPARISON WITH APPLICANTS' INVENTION

Steps 1, 2, 3, 4, 5 and 6 as described in claim 1 are not suggested by U.S patent 6,028,585. Applicants' invention can detect a screen's resolution but the detection is done at the hardware level, which is more reliable and efficient than the software detection suggested in reference [11].

Steps 1, 2, 3, 4, 5 and 6 as described in the summary of Claim 21 are not suggested by reference [11].

DETAILED DISCUSSION OF U.S PATENT No. 5,868,834 [12]

U.S patent 5,868,834 concerns a method for resetting a video display mode. The method allows a user to reset a computer's video display mode without reloading the operating system, or exiting currently running applications. The resetting, as described in reference [11], is initiated by a user request to change a display mode. The display characteristics of the operating system and the display driver, as well as the hardware mode, are thereafter modified according to the requested display mode. Afterwards, the display screen is repainted to display images generated by currently running applications in function of the requested dual display mode. One of the features available to the user, is the zoom application.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 5,868,834 suggests the combination of steps 1, 4, and 5, as described in the summary of claim 1, but not that of steps 1, 2, 3, 4, 5 and 6. The user can select a portion of an image to be scaled, and display it. However, the system does not determine the zoom display screen's resolution, and change the aspect ratio of the selected area accordingly. Furthermore, the scaled region is displayed on a zoom apparatus device according to Applicants' invention, which is not the case for reference [12] where the same display screen is repainted to obtain a scaled version of the selected region.

U.S patent 5,868,834 suggests the combination of steps 1, 4, and 5, as described in the summary of claim 21, but not that of steps 1, 2, 3, 4, 5 and 6. The user can select a portion of an image to be scaled, and display it. However, the system does not determine the zoom display screen's resolution, and change the aspect ratio of the

selected area accordingly. Furthermore, the scaled region is displayed on a zoom apparatus device according to the Applicants' invention, which is not the case for reference [12] where the same display screen is repainted to obtain a scaled version of the selected region

DETAILED DISCUSSION OF U.S PATENT No. 4,885,183 [13]

U.S patent 4,885,183 relates to a method and a device to enlarge images. When a user wants to enlarge an image, he must first enter the position of the image to be enlarged (position 1), the position of the image after it has been enlarged (position 2), and the desired magnification ratio X . Once these parameters have been entered, the device checks whether positions 1 and 2 overlap. If they do, the device determines whether the image will be broken once enlarged. If it will be broken, the image is shifted accordingly. The device then varies the ratio of the speed at which the image data is written in a buffer memory to the speed at which it is read out therefrom. Consecutive enlargement processes take place to scale the image according to the specified magnification ratio X .

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 4,885,183 suggests the scaling of an image, the conversion of the image into a display signal, and the display of the enlarged image. However, it does not suggest displaying the enlarged image on a different apparatus. Furthermore, the user does not have the option of selecting a portion of the displayed image to be enlarged. Therefore the apparatus described in reference [13] does not allow the user to see an enlarged portion of an image on one screen, while displaying the full image on another one. Hence, steps 1, 2, 3, 4, 5 and 6 are not suggested as described in the summary of claim 1.

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DETAILED DISCUSSION OF U.S PATENT No. 5,182,103 [14]

US patent 5,182,103 relates to an image display apparatus for improving image observation and analysis. The apparatus comprises a workstation that is provided with images from image generating apparatus through an imaging network. The work station comprises an image memory for storing images, an enlargement/reduction processor, a frame memory to store edited images, a D/A converter for converting digital images data into analog data, a CRT display defined by display size data S_d and display pixel size data Δd for displaying edited images, a transfer controller to transfer image data in a designated region of interest in the image memory, a console allowing for user input, and a display controller that outputs enlargement/reduction ratios β . When a user wants to enlarge an image stored in the image memory, he manually inputs the original image size data S_r , the original pixel size data Δr , the magnification α , the display size data S_d and the pixel size data Δd , using the console. The display controller thereafter calculates an enlargement/reduction ratio $\beta = (\Delta r / \Delta d) * \alpha$, and sends β to the enlargement/reduction processor. The latter enlarges/reduces the original image stored in image memory and transfers the processed image to the frame memory. The system allows the user to display two scaled images on two displays, or a plurality of overlapping/non-overlapping scaled images on the same display.

COMPARISON WITH APPLICANTS' INVENTION

US patent 5,182,103 allows a user to scale a portion of an image but does not disclose allowing a user to specify the portion of the main display memory that he would like to scale. Furthermore, reference [14] does suggest any adjustments of the performed scaling relating to the screen's aspect ratio. Therefore the combination of steps 1, 2, 3, 4, 5 and 6, as described in the summary of claim 1 are not suggested by reference [14].

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DETAILED DISCUSSION OF U.S PATENT No. 5,805,142 [15]

U.S patent 5,805,142 relates to an apparatus for image editing, and setting regions corresponding to image editing functions on a display screen. When an image is read, the apparatus determines a region in which it will display the read image, enlarges/reduces the image to fit in the determined region, and displays a frame line indicative of the editing region according to the size of the image. As a result, only a determined region of the display screen can be edited. The other region of the display screen is separated into small regions corresponding to editing functions. Once an image is read, the user can use his cursor to determine an editing region and an editing function, and edit the selected region accordingly.

COMPARISON WITH APPLICANTS' INVENTION

In U.S patent 5,805,142, steps 1, 4 and 5 as described in claim 1 are suggested, but not the combination of claims 1, 2, 3, 4, 5 and 6. The user can select a region and scale it, but the reference does not suggest adjusting the scaling according to the screen's aspect ratio. It also does not suggest displaying the edited region on another display apparatus, for better image analysis. Therefore reference [15] does not suggest the Applicants' invention as described in claim 1.

In U.S patent 5,805,142, steps 1, 4 and 5 as described in claim 1 are suggested, but not the combination of claims 1, 2, 3, 4, 5 and 6. The user can select a region and scale it, but the reference does not suggest adjusting the scaling according to the screen's aspect ratio. It also does not suggest displaying the edited region on another display apparatus, for better image analysis. Therefore reference [15] does not suggest the Applicants' invention as described in claim 21.

DETAILED DISCUSSION OF U.S PATENT No. 5, 596, 346 [16]

U.S patent 5, 596, 346 describes an invention relating to image processing as applied to photographic images. The present invention allows a user to display an image that needs to be processed on a display screen presenting touch sensitive control areas. These areas typically provide users with zoom-in, zoom-out, pan, apply, and undo functions. For example, if a user needs to remove a red-eye on a picture, he can zoom-in on the eyes by touching the zoom-in control area and touch a point in the surroundings of the red-eye. The point touched by the user is moved to the center of the display screen and an enlarged version of the image is displayed according to a predetermined scaling factor. The user can then touch the pan function, and the region of the red-eye, to move the red-eye to the center of the display. Afterwards, the user can zoom-in on the eye a second time to clearly determine whether the red-eye condition exists. If the condition exists the user selects the "apply" control area. The

display screen will then display the user's option, including "red-eye condition". The user can select the red-eye condition, and touch the eye on the screen to correct the artifact condition. The user can then zoom-out to verify if other artifact conditions are present on the picture.

COMPARISON WITH APPLICANTS' INVENTION

U.S patent 5, 596, 346 only suggests the scaling of the surroundings of a selected point on an image and the display of the scaled version of the image. Therefore, only steps 4 and 5, as described in claim 1, are suggested.

Reference [16] only suggests the scaling of the surroundings of a selected point on an image, and the display of the scaled version of the image. Therefore, only steps 4 and 5, as described in claim 2, are suggested.

DETAILED DISCUSSION OF U.S PATENT No. 5, 125, 043 [17]

U.S. patent 5,125,043 relates to image processing to provide electronic enlargement and display thereof by video technique. The apparatus can receive and store a digital input image for zoom processing. The user can selectively establish a zoom factor for zooming of the input image, select display of desired regions of the zoomed image, and select contrast of the zoomed image. The apparatus then performs bilinear pixel interpolation to process successive groups of adjacent pixel data values throughout a displayed portion of input data in accordance with a zoom factor established for the video display frame. Each successive video frame may have a different zoom factor and a displayed region of the zoomed image can be position shifted from one video frame to the next video frame according to user control.

COMPARISON WITH APPLICANTS' INVENTION

U.S. patent 5,125,043 suggests steps 1, 4, and 5 as described in claim 1. Reference [17] does not disclose or suggest a zoom display device or adjusting the resolution of a zoom display device. Therefore, reference [17] does not disclose Applicants' invention and steps 1, 2, 3, 4, 5 and 6 are not suggested as described in the summary of claim 1.

U.S. patent 5,125,043 suggests steps 4, and 5 as described in claim 21. Reference [17] does not disclose or suggest a zoom display device or adjusting the resolution of a zoom display device. Furthermore, reference [17] does not disclose or suggest scaling a non-integer fraction of a display. Therefore, reference [17] does not disclose Applicants' invention and steps 1, 2, 3, 4, 5 and 6 are not suggested as described in the summary of claim 21.

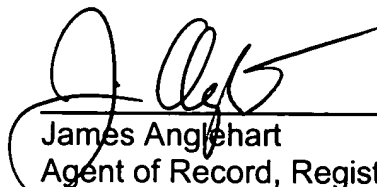
CONCLUSION

In view of the foregoing, it is believed that the present application is in good order to be made special, and early consideration to that end is accordingly courteously solicited.

In accordance with 37 CFR 1.97(h), the submission of the present information is not to be construed as an admission that such information is, or is to be considered to be material to patentability.

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